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JOURNAL OF THE STATISTICAL SOCIETY,

SEPTEMBER, 1869.

OPENING ADDRESS of the PRESIDENT of SECTION F (ECONOMIC SCIENCE and STATISTICS), of the BRITISH ASSOCIATION for the ADVANCEMENT of SCIENCE, at the THIRTY-NINTH MEETING, at EXETER, August, 1869. By the RIGHT HONOURABLE SIR STAFFORD NORTHCOTE, BART., C.B., D.C.L., M.P.

IF it had not been the custom for those who occupy the position which I have been called on to fill, to open the proceedings of the Section with some general remarks, I should have invited you to proceed to the consideration of the papers which will be laid before you, without any preface. For the preface is not only the dullest part of a work, and that which is the most frequently skipped; but, as a matter of authorship, it is the part which ought to be written last, because it ought to be adapted to that which is to follow it; and what that may be, I do not yet fully know.

Forecasting, however, as well as I can, the character of the work which now lies before us, though not prepared as yet to present to you a summary of what you may expect, I cannot doubt that the transactions of the present meeting will continue to exhibit the tendency of statistical inquiry to take year by year a wider range. That such is its tendency is, I think, not only evident to the observer, but may be said to be a law of the science. For the statist is not animated by a mere spirit of curiosity, nor does he content himself with the simple accumulation of facts. His objects are at once nobler and more practical. He aims at discovering the actual condition of his country, and the causes of that condition, with a view to discover also the methods of improving it. Now, even the true condition of the country is not immediately obvious to the superficial observer; while the causes of the several phenomena which it exhibits lie very deep, and can only be discerned by the aid of patient and extensive inquiries, conducted with skill and discernment, as well as with the most rigid exactitude; and the investigation of the methods by which improvements may be effected imposes a further and at least an equally severe labour. The "Condition of England" question is one which does not lie in a nutshell.

I need not, I am sure, recall to the recollection of such an audience as the present, the interesting Report presented by an eminent member of this Association,* whom we have now the pleasure of seeing amongst us, to the International Statistical Congress of 1860. You will remember how he drew attention to the two great laws which the study of statistics reveals to us, and on which the science rests,—the law of Stability, which teaches us to deduce from the observation of particular phenomena general conclusions as to the regularity of their recurrence; and the law of Variation, which teaches us in what manner, and within what limits, the conditions of human life, and the current of human action, may be modified or controlled by man. The main interest of our studies is, of course, concentrated on the working of this second law, and on the discovery of the limits within which our power is confined, and here it is that we find the necessity for that extension of the range of our inquiries to which I have adverted.

As in the case of most other sciences and branches of learning, so most assuredly in the case of Statistics, our progress is marked by a series of disappointments. We begin in ignorance and we plunge into error; then we find out our mistakes, and, after having fancied that we had attained to great proficiency, learn, like the wise man of old, that the sum of our knowledge is, that we know nothing. From that point, if we are wise enough and honest enough to profit by our experience, we may indeed begin to make some solid progress; but both wisdom and honesty are needed for the purpose; aye, and courage too, and self-denial. For it is no slight trial to a man, who with much labour and much ingenuity has collected a mass of materials, and has constructed a theory out of them, to find that, through some mistake or oversight, he has gone wrong from the first, and that the whole work must be taken to pieces, the materials sifted and rearranged, and the favourite theory abandoned. No one will go through such a trial who is not supported by a genuine love of truth, and by a hearty conviction that it is a prize worth every sacrifice.

But this lesson, at all events, we learn from the history of these disappointments, and from the still more melancholy spectacle which sometimes presents itself of men fighting against facts in support of a theory, and trying to bend them to it, and to suppress what makes against it;—we learn that it is important to spare no pains in the first collection of our materials, to neglect no source of information, and to despise no element of calculation. We learn to be slow to dogmatise, and to be patient of correction and contradiction. And we learn, or ought to learn, that we cannot successfully

* Dr. Farr.

conduct a statistical inquiry into any particular subject, without keeping our attention alive to the inquiries which other persons are conducting in connection with other, and, perhaps, apparently remote, subjects, and to the bearing which their discoveries may possibly have upon our own.

Let me illustrate what I have been saying by a brief reference to our vital statistics.

Here, in the first place, we have an interesting illustration of the law of Stability and of the law of Variation. We are able to deduce from the statistics of births and of deaths averages of human life on which we can calculate with considerable certainty; and by so doing we are of course enabled to secure some important advantages. But we go further, we distinguish the various causes of death; we separate those which appear preventible from those over which we seem to have little or no control; and we conclude that if we can hit upon the proper remedies, we may so far qualify the rigid law of Stability by invoking the aid of her elastic sister the law of Variation, as to diminish in a sensible degree the rate of mortality, and to lengthen the term of human life. We act on the conclusion, and we apply our remedies. At first we flatter ourselves that we are in a fair way to attain our object; but, just as we are congratulating ourselves on having done so, some disagreeable fact crops up in an unlooked for quarter, which seems to upset our entire theory. We have just now had our attention drawn to a striking illustration of this contingency. Among the most prominent causes of death some years ago, small pox held a foremost place. To children it was especially fatal. But small pox, we learnt, was a disease preventible by vaccination. Vaccination was called to our aid, and with great success. The deaths by small pox were reduced within an exceedingly narrow compass. But it appears that while this, the most formidable, foe of childhood has been repelled, infant mortality has not been reduced in anything like a corresponding proportion. Diphtheria and scarlatina have taken the place of the vanquished malady; and the law of stability seems to be reasserting its authority, and to be demanding that, whether it be by the one disease or by the other, a like proportion of children shall every year fall victims among us. Our statist, however, are not discouraged by this untoward discovery. They draw from it the true inference,—that the causes of infant mortality, and indeed of human mortality at large, lie deeper than in the prevalence of a particular form of disease; and, while perceiving that vaccination alone will not put a stop to the premature deaths of children, they still believe those premature deaths to be in a measure preventible, and they seek for further methods of prevention. Having found that the repression of a particular disease is not sufficient, they

inquire into the predisposing causes which render our children obnoxious to disease generally, eliminating as it were from their inquiry the element of which they have already ascertained the value, and not troubling themselves to look for specifics against scarlatina or diphtheria, but for general prophylactics against diseases of whatever kind. In short they broaden the investigation, and seek to ascertain the general conditions of health.

This is in itself a great step in advance; but we must discard the proverb which tells us that it is but the first step which costs trouble. The further the inquiry is carried, the more its difficulties will show themselves. Remedies, which, before they have been tried, appear certain to be efficacious, may, when tried, only serve to show that we have not yet reached the root of the matter; while the collateral questions which the investigation will open up will prove, we may be well assured, pretty intricate ones to settle. When we are told that the primary object to aim at is, the "placing a healthy stock of men in conditions of air, water, warmth, food, dwelling, and work, most favourable for their development," we feel that we have a task of pretty fair dimensions before us, and when we learn, among other things, that "a bad land tenure is a cause of death" (a proposition which does not appear to be limited to the case of Tipperary landlords), we may be pardoned for doubting whether any one can assign bounds to the range of the inquiry we have undertaken.

It is therefore both natural, and satisfactory, that statistical inquiry should year by year be extending to wider fields; since no one branch of it can be successfully pursued without speedily bringing us to the necessity of inquiring into the progress which is being made in other branches. The statistics of education, of crime, of pauperism, of labour, of health, of trade, of agriculture, of manufactures, and of every one of the details which enter into the survey of our national condition and prospects, are inter-dependent, and connect themselves one with another. At the same time, not only do they admit of being studied separately, but more true progress will be made by such a method of study. The educational inquirer examines the bearings of juvenile labour, for instance, from one point of view; the sanitary inquirer examines them from another; the inquirer into the causes and conditions of pauperism from a third; and so on. Where their inquiries tend to similar conclusions, each confirms the other all the more for the independence of their lines of argument. Where the conclusions are inconsistent, they are all the more suggestive; and suggestiveness, as it seems to me, is what constitutes the great value of statistics.

The old sarcasm, that you may prove anything by figures, has no doubt much truth in it. In the sense in which the words are

usually taken, they convey a protest against crude, and of course still more against unfair, statistics. But we may perhaps affix another idea to them, and one less uncomplimentary to our science. I am sometimes inclined to look at a great mass of statistics, undigested and shapeless as it seems, in the spirit in which the sculptor may be supposed to look at the rude block of marble out of which he is to fetch the form of beauty that lies hid within. Innumerable are the lessons which may be drawn from those hopeless looking figures, if only the student knows how to search for them; just as the forms which might be developed from the marble are innumerable, if the artist knows how to bring them to light. Remote as the region of statistics appears to be from the region of the imagination, there is no pursuit of which it may more truly be said that its success depends upon a proper exercise of the imaginative faculty. A wholly unimaginative statist is as intolerable as an unimaginative verse writer. A man must know what he is going to look for, and how he will look for it, before he begins his examination of a mass of figures; but he must keep his mind open, throughout the process, to receive the suggestions which the study is sure to produce. He must work upon an hypothesis, but he must be ready to abandon it as soon as he finds it untenable; and he should be quick to form new hypotheses, and to subject his materials to new tests, as occasion arises. For all this kind of work it is of great advantage that other minds should be brought into contact with his own, and that he should profit by the suggestions which their independent inquiries cannot fail to elicit.

It is of course obvious that meetings such as that in which we are now engaged, are likely to advance the study in the direction which I have been indicating. But that is not their sole advantage. It is, I think, no slight one, that we are called on to dispute in public, and to address ourselves to a general audience. If our studies are really valuable, if our methods of conducting them are sound, if we are doing good service to our country, we certainly ought to be able to interest and to attract our hearers. The subjects with which we deal are of general concern; they are not mere matters for closet speculation, nor is it good that we should treat them as if they were. Neither does the discussion of them involve the necessity for the use of strange or technical language; nor is it even necessary that we should weary our hearers with long columns of figures. It is rather a sign of indolence than of profundity when speakers oppress their hearers with technical phrases, and with processes of arithmetic. These should be used in the closet, but should be as sparingly as possible obtruded on the platform. Our methods of inquiry should indeed be strictly scientific; and we should never cease to be on our guard against

fallacies; but we should adapt our arguments to the circumstances of human nature, and endeavour to make them attractive by making them intelligible. In a word, if I may borrow an illustration which promises to take root among us, we must make our hearers feel that we are all on the earth together, and that we are not mere aeronauts addressing them from a balloon.

And here may I venture, as a Devonshire man, while bidding you heartily welcome to the county, to bespeak your indulgent consideration of the circumstances of my compatriots? We Devonians do not hurry on in the race of life quite so rapidly as some of our fellow-countrymen. Perhaps I may venture to say without offence that, as compared with north-countrymen, we live slowly. Our birth-rate is below the average of England, and so is our marriage-rate; but then it must be remembered that our death-rate is also low. If you compare us with Lancashire, for instance, you will find that, for less than 32 births per 1,000 in proportion to the population here, there are more than 38 per 1,000 there; [the precise figures for 1867 are Devon 31·75, Lancashire 38·19] that, for less than 16 marriages per 1,000 here, there are more than 19 per 1,000 there [Devon 15·72, Lancashire 19·04]. But then, for less than 20 deaths per 1,000 here, there are nearly 27 per 1,000 there [Devon 19·72, Lancashire 26·83]. So, again, you will find that our children die less rapidly than theirs, and our old people attain to greater ages. The proportion which the deaths of children under 5 years of age bear to the births in the year is, in Devonshire $19\frac{1}{3}$ per cent., and in Lancashire $32\frac{1}{2}$; while the proportion of deaths of people over 65 years of age is, in Devonshire $18\frac{1}{4}$ per cent., and in Lancashire $8\frac{3}{4}$ per cent. Our marriages, too, take place at a more advanced age than do theirs. Of our men only 6·05 per cent. marry under 21 years of age; of theirs 8·45 per cent. do so. For women the proportions are, in Devonshire 16·81 per cent., and in Lancashire 21·10. In short, we are born, we marry, and we die more slowly than they do. But we are not behind them in all things. If the state of education is to be judged of by the proportion of married people who can write their names, we may hold up our heads even by the side of Lancashire. Of our bridegrooms (in 1867) 82·7 per cent. wrote their names like men; of theirs only 76·8 per cent. Our brides did still better in proportion: 78·6 of them wrote their names, while in Lancashire only 56·0 did so. In the matter of wealth no doubt we are behind them; our assessment to the Schedules A, B, D of the income tax comes to only 10*l.* 12*s.* per head of our population, while theirs comes to 13*l.* 14*s.* On the other hand I doubt whether we have a very much larger number of paupers in proportion to our population than they have (on the average of the three years 1866-68 they seem to

have had 65 able-bodied paupers to every 10,000 of the population, while we had 69). And as regards criminals we fall far short of their ratio; the proportion of persons committed or bailed for trial in 1867 having been in Devonshire less than 4 to 10,000, and in Lancashire 12 to 10,000.

There are many other points on which it would be interesting to compare the two counties; and the comparison would be rendered still more valuable by extending it to other counties, of which these might be taken as the types. But time forbids my entering into the details which would be requisite. I have referred to the point principally for the purpose of reminding you that observations which might have been applicable in one part of England may be very much out of place in another; that each county has lessons of its own to teach, as well as to receive; and that Devonshire, though she does not aspire to the position of Lancashire as the standard bearer of British manufacturing and commercial enterprise, is not without her own claims to respect and admiration in regard of many of the essentials of human happiness.

I return from these local remarks to the wider field which more properly claims our attention; and I desire to invite you, who are so much more competent for the task than I am, to endeavour to realise for yourselves as far as may be the general character and tendencies of the age in which we live. To me it appears to be emphatically, and in the highest sense of the term, a statistical age; an age, that is to say, in which we are inquiring extensively and methodically into the facts by which we are surrounded, comparing ourselves with our neighbours, measuring our progress, and estimating our prospects with unprecedented care. Nor do we stop here; but, giving a practical turn to our inquiries, we study not only to ascertain, but to husband and to develop, our resources. Pressed, it may be, by the increasing competition of foreign nations,—pressed, too, by the consideration that our wealth and our desires for enjoyment are increasing far more rapidly than our population, and consequently than our supply of labour,—and conscious, moreover, that the non-reproductive sources of our material wealth, such as our minerals, are being very heavily drawn upon, we are daily casting about to find how this competition may best be sustained, how the balance between capital and labour is to be preserved, and how we can best economise those supplies which we fear may some day fail us.

We are beginning to feel that the time for waste has gone by. It may, perhaps, provoke a sneer from the cynic when he hears that England is becoming anxious as to the possible exhaustion of her coal measures, and is considering how and where she can find water enough for her population. One cannot help being reminded

of the sarcastic remark of the American traveller—that we had a tidy little country enough, but that for his part he was always afraid of tumbling over the edge of it. There is some truth at the bottom of the taunt; but it is not to such considerations that I wish to direct your attention. Rather I desire to point to the satisfactory indications, which such inquiries as I refer to present, of the determination of our people to make a stand against the bane of national prosperity,—Waste. I speak not only of waste of raw materials, but of waste in all its forms,—waste of power, of labour, of time, of health, and of life. Year by year we are learning to make skill do the work of strength, to draw greater results from equal efforts, and to supply our labourers with every comfort, every advantage, which science can devise for enabling them to fight the battle of life on better terms; and hence it comes that the question of education is not only claiming a larger share of our attention, but is presenting itself in new phases; and that we are looking to education in physical science, and even to technical education, with such unwonted interest. We are grappling, I think, more boldly than we ever did before with the difficult problems of our national life, and are advancing to their solution with greater breadth of view and greater confidence of step.

Let me offer an illustration of the economy of labour which is taking place among us, by a reference to some remarkable statistics which have quite recently been laid before us. Last week my friend, Mr. Shaw Lefevre, introduced the Merchant Shipping Bill into the House of Commons; and, after pointing out the enormous increase which had taken place in our commercial navy in the last fourteen years, and showing that we had now as much sea-going tonnage as all other nations put together, proceeded to say, that, while the amount of tonnage had increased since 1854 by no less than 50 per cent., the number of seamen required to navigate it had increased by only 21 per cent; that in 1868 we required one man less to work every 100 tons of shipping than we required in 1854, or, in other words, that we could work our present marine with 55,000 fewer men than would have been necessary for the same amount of tonnage fourteen years ago. And, to show to how great an extent this economy had been brought about by the introduction of machinery and improved methods of working, Mr. Lefevre gave the particulars of the manning of twenty-two large sailing vessels in the years 1849, 1859, and 1869 respectively, showing that in the first of those years they required crews amounting to 463 men, in the second to 417, and in the third to no more than 348;—the ships being identical, and the voyages nearly the same.

I have dwelt at some length on these figures, because they suggest to me several reflections. The first is one in which I think

we may justly indulge, and which is the counterblast to that sarcasm which I quoted just now from an American critic;—that the power of England is not to be measured by the dimensions of this little island, but rather by those of the great empire of the seas which it has so long been our boast to rule. If we were to fall over our country's edge we should only fall into an element which we have made our own. England, it may truly be said, that is, the mere island of Great Britain, is but the shadow of herself, and we might address our rivals in the proud words of the Talbot of Shakespeare—

“ You are deceived, my substance is not here ;
For what you see is but the smallest part
And least proportion of humanity.
I tell you, madam, were the whole frame here,
It is of such a spacious lofty pitch,
Your roof were not sufficient to contain it.”

Justly, then, in our statistical inquiries we take note, not only of the progress of England proper, but of all parts of the great British empire; and this you will observe in looking to the various collections of information which Parliament is annually making for us,—that year by year fuller statistics are produced with relation to our colonies and dependencies. That valuable Fifteen years' abstract, which has now reached its sixteenth number for the United Kingdom, has been adapted to the British colonies for four or five years past, and to India for two or three. We have, in addition to these compendious handbooks, several more voluminous collections of tables relating both to our colonies and to foreign countries, enumerating not only their areas, populations, amounts of revenue, expenditure, and debt, and the extent of their trade; but in the cases of many of our colonies giving most useful information as to their moral and social condition, the state of education, of crime, of immigration, of wages, of prices, of land sales, mortgages, savings' banks, and an immense variety of other matters. All these are a testimony to the extended character of our transmarine connections and interests, and may be taken at once in explanation and in justification of our position as a colonising power. In spite of all that may be said as to the alteration of the relations between England and her dependencies, she need hardly be called on to abdicate her proud title of the “Mother of Nations,” while she can point to these effects of her influence in every quarter of the globe.

Another reflection which occurred to me when I dwelt on those statistics of our shipping just now, was this: Our population continues to increase; but it increases far less rapidly than our wealth. That is a fact which, if it stood alone, would indicate that in the struggle between capital and labour the advantage was likely to be

on the side of labour, for that the demand would be in excess of the supply. But this advantage is to a considerable extent corrected by the increasing economy of labour indicated by the figures which Mr. Lefevre gives us for a single trade, and which are no doubt equally applicable to other trades.

It is sufficiently obvious that such economy must in the main be advantageous; at the same time we must not forget that the displacement of labour is often the cause of suffering, and sometimes, when it occurs suddenly, of very severe suffering. It may produce, not only individual distress, but, under certain circumstances, even political danger. If it were possible so to reconstruct society as to give every individual member of it a direct share in every gain made by society as a whole, this particular danger would of course vanish. But this is the theory of Socialism; and we have no evidence that, if socialism were in the ascendant, society would make these gains at all. Reasoning leads us to the conclusion that it would not; and the time is probably far distant when England will accept a system which has so obvious a tendency to discourage private and individual enterprise.

Nevertheless, it cannot be denied that Englishmen are beginning to look to Government for assistance, and to distrust individual action, to a much greater extent than formerly.

Some years ago it used to be thought to be the duty of the Government to foster private enterprise by protective laws, monopolies, bounties, and differential duties. The great Free Trade movement overthrew this theory, and left upon us the impression that, the more private enterprise was left to itself, and the less the Government interfered with it, the better. But of late the tide of public opinion has seemed to be setting in a somewhat different direction. Not that we are going back towards the protective system; but that, on the one hand, we are beginning to invite or to urge the Government to take upon itself work for which a few years back we should have deemed it utterly incompetent, and which we should have jealously reserved for private hands; while, on the other hand, our private enterprise is becoming more and more dependent on the assistance of the Government for its own proper organisation and development. Thus, in this matter of our Merchant Shipping, while we have been repealing our navigation laws and sweeping away every vestige of a differential duty, we have been creating a code of almost Brobdignagian dimensions for the regulation of every detail of our marine affairs. The choice of proper masters and mates is no longer left to the discretion of the shipowner; he must employ men who have passed a Government examination, and who hold certificates which the Government may cancel in case of any misconduct. The contracts between owners

and seamen are regulated by the Government, and are made under the direct superintendence of public officers. The proper construction and fitting of the ships, their sanitary arrangements, the quantity and quality of the provisions and medicines, and the strength and texture of the anchors and chain cables, are all matter for the consideration of the same paternal mind. Nor is this kind of care confined to a single branch of industry. There are many others with which the Government concerns itself, and still more with which it is pressed to do so ; while at the same time we are becoming accustomed to its direct action in the management of various classes of business, and are not unwilling to see that action further extended.

Can it then be that we are learning to sink the idea of the individual in the idea of the State ? Do the mass of the people, as our constitution becomes more democratic, begin to see in the Government an organ better fitted to do their work than they find in the classes above them ? Perhaps, as monopolies are put down, and privileges abated, and education is more generally diffused, and a closer approach to equality is effected, the tendency to deal with questions nationally, rather than by the action of classes or of individuals, may increase. Perhaps, as the competition of foreigners presses upon us with greater severity, and as we become conscious that it is only to be encountered by the aid of all the resources, all the education, all the organisation that we can command, it is natural that the desire to invoke the powerful aid of the State in gathering up all the elements of our strength and giving it the best possible direction, should become more and more marked. Perhaps there may be something in the nature of things, which renders co-operation more and more necessary as we make greater progress in the work of subduing the universe. In the ruder states of society, when industry is in its infancy, the isolated labour of the individual suffices to procure the simple necessities of life which he requires. As civilisation advances, and greater results are sought, co-operation begins, and the division of labour is resorted to. By degrees we introduce, first the small capitalist, then the larger one, and then the joint-stock company. It may be that the tendency to invoke the aid of the Government is but another step in the same career. Or possibly we may explain it by the fact that the progress of civilisation is, as of necessity, accompanied by the growth of new dangers against which precautions have to be taken which the State alone is competent to take. In a civilised society, as we have lately been reminded, deaths by violence, that is to say by accident, have a tendency to increase. In England they are rapidly increasing, and special precautions are needed to render safe that free application of the vast forces of nature to the intercourse and the arts of

life which is now so essential to our prosperity. Or, lastly, it may be that in the increasing struggle for wealth the interests of the weaker classes, of the poor, the young, the female, are likely to be set aside unless the State interfere for their protection: and the acknowledged demand for such interference may be another cause for the tendency to which I have referred. Such seems, at all events, to be the tendency of the age, and it is one which it is impossible to notice without some uneasiness. That we have hitherto been somewhat too jealous of the State, and that it would be wise to call in its aid rather more freely, may probably be true. But the greatness of England has been achieved by the self-reliant energies of individual Englishmen; and by the energies of individual Englishmen it will be best maintained.
